72-173 AU 321 45601 56 BRITAIN

GB 0743485
JAN 1956

43,485 COMPLETE SPECIFICATION
3 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEETS 2 & 3

72/173

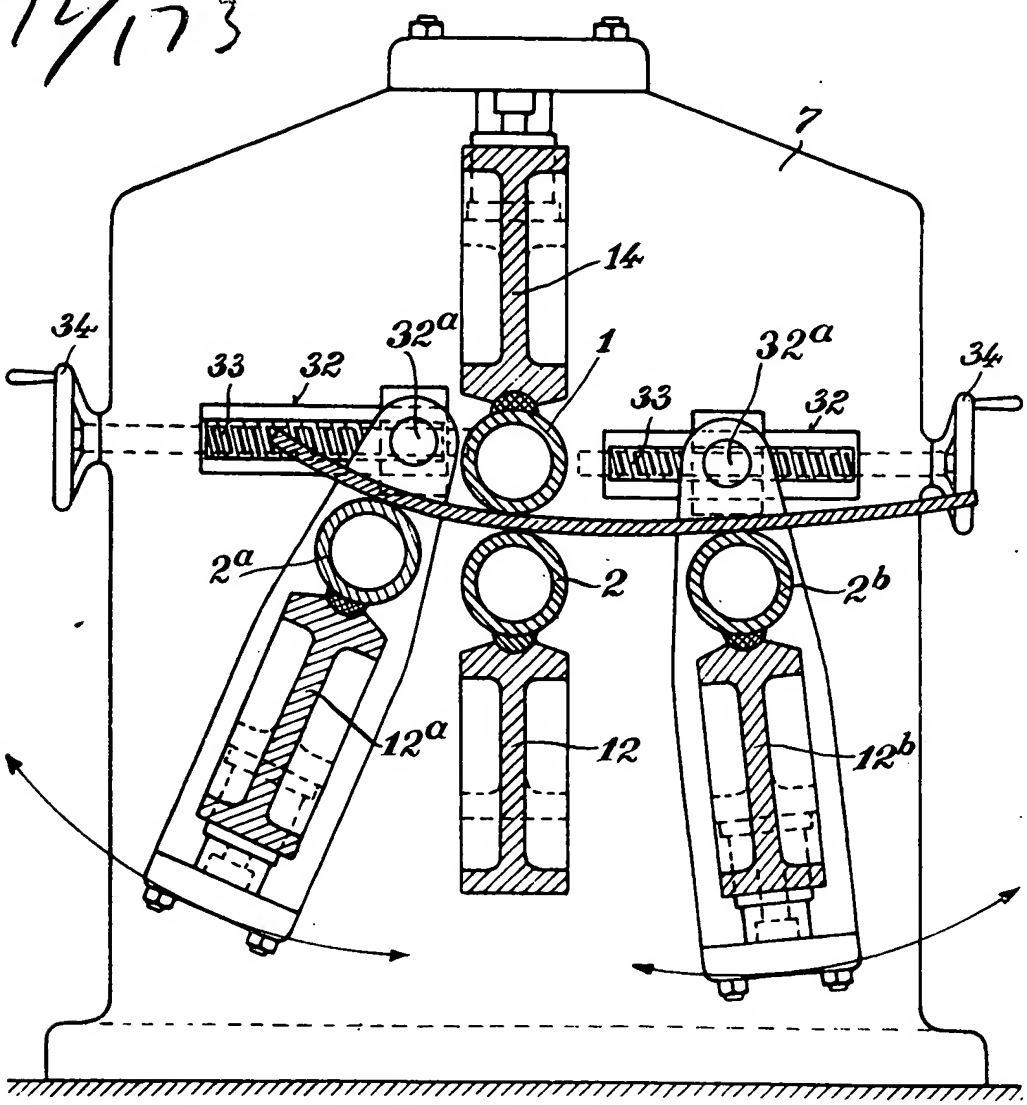

Fig. 6

743,485 COMPLETE SPECIFICATION
3 SHEETS

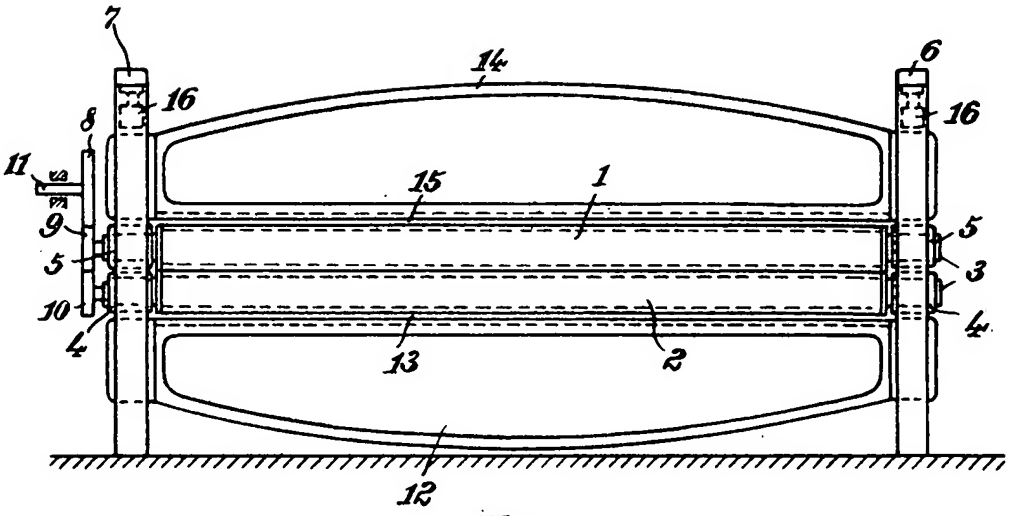

Fig. 1

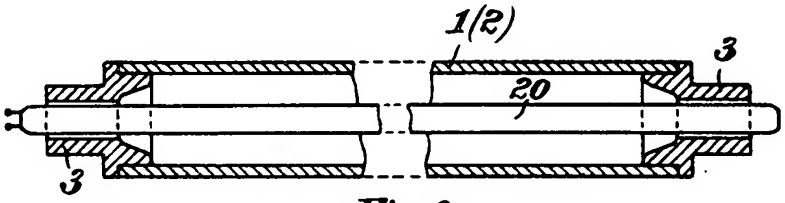

Fig. 3

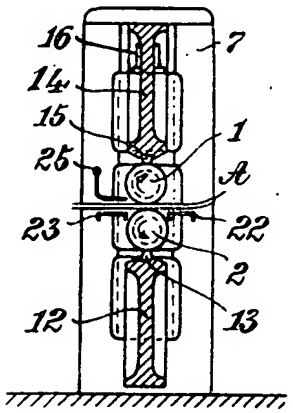

Fig. 2

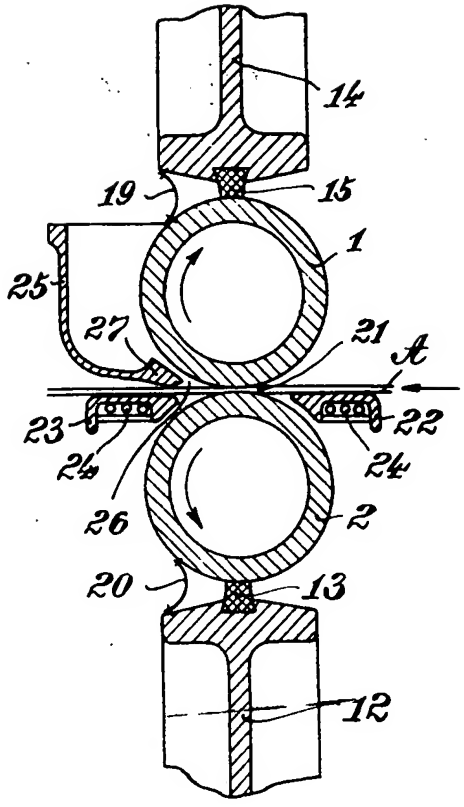
14
19
15
1
25
27
21
A
23
22
24
24
26
2
20
13
12

Fig. 4

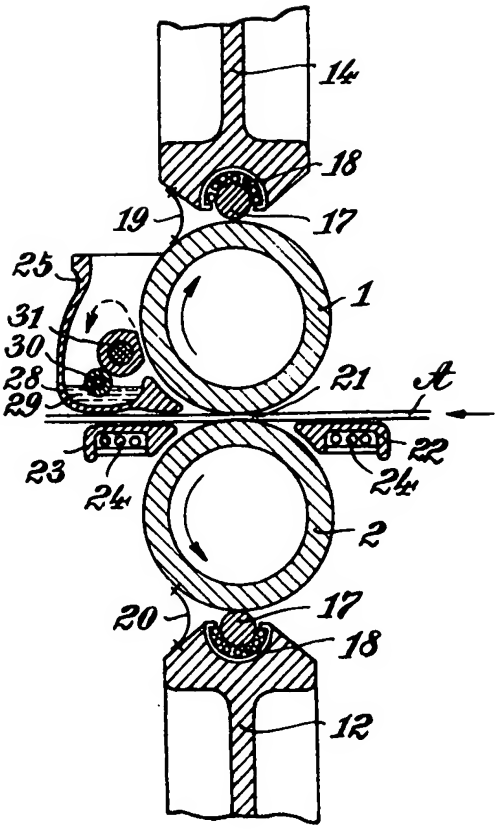
14
18
19
17
25
1
31
30
28
29
21
A
23
22
24
24
2
20
17
18
12

Fig. 5

PATENT SPECIFICATION 743,485

Date of Application and filing Complete Specification: Dec. 30, 1952.

No. 32939/52.

Application made in Germany on Dec. 31, 1951.

Complete Specification Published: Jan. 18, 1956.

Index at Acceptance:—**Classes 83(4)**, E1H4, E10E(1 : 2), M(13 : 17C); **96**, A7B(1 : 24), D7; **and 120(1)**, B1A2.

COMPLETE SPECIFICATION

Improved device for rolling carded fibre fleece and other material

We, SPINNBAU G.m.b.H., a German Company, of Bremen-Farge, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to devices for rolling fleece of carded wool, and other material.

Rolling devices are known wherein, due to pressure of the rollers, the most varied materials mainly in the form of sheets or bands are shaped, rolled, pressed, flattened, printed upon or impressed. The thinner and the more sensitive to pressure the material to be processed is, the more evenly must the pressure be distributed along the whole width of the rolling device. To attain this in a perfect manner, the working rollers of the device must have the highest degree of rigidity, i.e. they must not be subject to any bending. For this reason the rollers which do the work, especially those of great length, have a large moment of inertia. This in turn means that the rollers will be heavy, resulting in undesirable bending. To prevent this it has been already suggested to support the rollers of rolling-devices in several places, either by arranging separate bearings at spaced distances along the working length of the rollers or by supporting-rollers of the same length as the working rollers.

Supporting bearings of the first mentioned kind have the disadvantage that they gradually work their way into the surface of the working rollers, with the result that they lose their accuracy. Besides, the separate supporting bearings must be adjustable with regard to the end bearing of the working rollers and because of local wear, need constant attention. Thrust-rollers the same length as the working rollers increase the weight of the device or rolling mill appreciably. They also need constant care and lubrication and make the rolling mill much more expensive.

It has also been already suggested to grind the working rollers barrel-shaped, so as to compensate for the unavoidable bending. This step can only be regarded as a make-shift, as a certain barrel-shape can only ensure the required even distribution of pressure for a given working load. As soon as another workpiece is being dealt with and another load is therefore used, the bending of the working rollers will be different, and the effect aimed at by giving the rollers this special shape is no longer attained.

In many cases it is desired to control the temperature of the material to be treated, during the rolling-process, in other words to heat or to cool it. To attain this, the solid rollers must be bored out and provided with complicated pipe lines for the heating medium. This necessity further complicates the rolling device and also makes it more expensive.

The enumerated deficiencies and disadvantages are removed by the invention.

According to the invention, a device for rolling carded fibre fleece and other material includes two working rollers mounted in end-bearings and co-operating to roll and press the material, the one working roller being supported along the whole of its length by a non-rotatable and stationary beam, and the other working roller being acted upon along the whole of its length by a non-rotatable beam which is slidable relatively to said first-mentioned beam, means being provided for exerting pressure on the ends of the said slidable beam, and the end-bearings for the two rollers being freely and

[*Price* 3*s.* 0*d.*]

independently guided in end supports, so that pressure is transmitted from the slidable beam to the working rollers whilst leaving the end-bearings of the working rollers free of pressure. The beams are preferably of such a section that they offer a uniform resistance to bending at all points in their length. It is an advantage to arrange the beams in such a way that they can hinge around the working rollers so that they can exert their pressure in such a position as is called for by the momentary conditions on the working rollers. The term "working rollers" is used to indicate the rollers which operate to roll and press the material.

Each supporting or pressure-exerting beam may act on the corresponding working roller through a pressure transmitting member in the form of a continuous rail, or a continuous rolling member, of the same length as the working roller. With pressure beams which offer a uniform resistance to bending at all points in their length it is possible to make the working rollers hollow. Such hollow working rollers can serve as housings for heating and cooling media. The pressure-transmitting members of the beams can also be arranged as heating or cooling elements.

In certain cases it is necessary and advantageous to keep the working rollers free from clinging particles of the material being processed or treated. This can be attained by arranging mechanical scraping devices, of the length of the working rollers, on the thrust-beam, so as to press elastically against the working roller. Besides, a collecting trough for the clinging particles scraped off the working roller can be provided to act in conjunction with the pressure-rail or the scraping-device of the thrust-beam: this can be so constructed that it enters in a wedge-like fashion in the outlet slot of the working rollers and acts itself as a scraper. The collecting trough can also be arranged as a container for a chemical solvent, which is applied to the surface of the working roller for instance by at least one resilient spreading-roller driven by the working roller. Finally, guide-plates can be arranged in front and behind the working gap of the working rollers: these can be heated or cooled according to requirements.

As an example the invention is shown on the accompanying drawing:

Figure 1 shows a front view of the rolling device according to the invention.

Figure 2 is a vertical section through figure 1.

Figure 3 is a longitudinal section through a hollow working roller.

Figure 4 shows a vertical section through a part of the rolling device upon a larger scale.

Figure 5 is a modified construction shown in the same way as in Figure 4.

Figure 6 is a cross-section through a further form of construction.

The rolling device is particularly intended for rolling and squeezing a fleece of carded wool to crush any solid matter on the fibres. Referring to the drawings, the improved device comprises working rollers 1, 2 which are supported through their trunnions 3 in suitable plain- or roller end-bearings 4, 5 in which they can rotate, the said bearings 4, 5 being located vertically above one another in the side-frames 6, 7, and being freely and independently guided in the said frames 6, 7. The working rollers 1, 2 are driven in the usual manner by gear-wheels 8, 9, 10 from a driving shaft 11; and the side-frames 6, 7 are rigidly connected together below the rollers by a cross-beam 12, preferably of a section that offers a uniform resistance to bending at all points in its length, and on which the bottom working rolier 2 bears for its entire length through a pressure-piece 13. A similar beam 14, which preferably also offers a uniform resistance to bending at all points in its length, presses from the top against the upper working roller 1 through a pressure-piece 15 which also has the same length as the working roller 1. Contrary to the beam 12, the beam 14 is movable in a vertical manner at both ends in the side-frames 6, 7. The said beam 14 is acted upon at both ends by a pressure device, for example by hydraulic cylinders 16, whose pressure can be transmitted to the beam 14 simultaneously at both ends and in equal strength. The pressure transmission members 13, 15 of the beams 12, 14 which are in contact with the working rollers 2 and 1 over their whole length, transmit an ever constant working pressure on the working rollers which are relieved of pressure at their bearings so that they do not suffer any bending and can therefore have a much smaller moment of inertia and smaller diameter and less weight than is usual with the hitherto known rolling devices. The total working load is carried by the thrust-beams 12, 14 for the whole working width of the working rollers.

It is obvious that the working pressure can be obtained by other than hydraulic means with communicating cylinders 16, for instance by mechanical devices such as screw-shafts and the like.

The pressure evenly exerted by the cylinders 16 is transmitted to the working roller 1 through the beam 14 and the pressure transmission member 15; from here it is transmitted through the material being processed to the working roller 2 and the pressure transmitting member 13 to the beam 12.

At least two co-operating working rollers must be used and according to the use to which the rolling device is put, and the number of working rollers employed, the beams 12, 14 can be increased in number; or they may be angularly movable with regard to the roller circumference between the frame members 6, 7, into the most suitable positions.

Figure 6 shows a modified construction particularly suitable for bending sheet metal, with beams 12 and 14 and rollers 1 and 2, corresponding to the previous arrangement, but having, in addition, beams 12^a and 12^b respectively supporting rollers 2^a and 2^b, the beams 12^a and 12^b, with the rollers they support, being suitably guided and being movable angularly, as indicated by the arrows, about the axes of trunnions 32^a on nuts 32, which are themselves adjustable along screw shafts 33 rotatable by hand wheels 34.

The pressure-transmitting members 13, 15, which bear against the working rollers along their whole length, may consist of rigid bars, as shown in Figures 1, 2 and 4, let into the beams 12, 14, for instance in dove-tail or semi-circular grooves from which they can be extracted sideways. Or the pressure transmitting members may consist of roller bodies 17 as shown in Figure 5, supported, for example, by rollers 18 located in channels in the beams 12 and 14; or the rollers 17 may be supported in sideways retractable plain bearings in the beams 12, 14. The plain bearings, or the rollers 18, would extend for the full length of the rollers 17. Which kind of pressure transmitting member will be chosen, depends on the requirements of each individual case. For instance it is advantageous for certain textile processing machines, especially for fleece squeezers, to use pressure-bars of the sort illustrated in Figures 1, 2 and 4. They can consist of a bearing-metal or self-lubricating materials such as sintered iron, without experiencing any appreciable wear due to the working load. The pressure of the pressure-bars 13, 15 on the working rollers 2, 1 is indeed very small. In case of the before mentioned fleece squeezers, pressure-bars of the said kind have the special advantage that they keep the working rollers free from clinging bits, because these bits are automatically scraped off against the front edge of the bars. In addition to this the bars can be grooved, so as to provide scraping edges. Furthermore it is not excluded, but in some cases even desirable, to provide additional scraping off devices, for instance when very sticky fibrous fleeces have to be dealt with. Special scraping off strips 19, 20 (Figures 4 and 5) are in such cases fitted to the thrust-beams 12, 14, and they resiliently press against the rollers 1, 2 in question in the direction opposed to the movement of the surface. These scraping off strips can be made of strip spring steel, razor blade steel or such like, to which strips of felt or the like cleaning means may be added.

The novel transmission of pressure to the working rollers, or their novel support, enables them to be of small diameter and of small moment of inertia. They can therefore be made completely hollow as shown in Figure 3. This has in the one case the advantage of saving weight, on the other hand they are also easier to machine. Further, it is possible to temper the hollow working rollers without taking up much time for expensive machining of the rollers. It is for instance possible to introduce heat-exchange means in the hollow working rollers to increase or diminish the temperature of the latter. It is also possible to introduce special heating elements in the hollow shafts of the working rollers from outside, as for instance an electric element 20 as shown in Figure 3. The influencing of the temperture on the goods to be processed can also take place through the pressure transmitting members 13, 15 or 17, by supplying these with heating or cooling means. For this purpose, the pressure transmitting members can also be made hollow. Besides this they can be made of such dimensions that frictional heat is generated to keep the working rollers 1, 2 at the required temperature.

To ensure that the goods A to be processed enter, as well as leave, the rolling device at the right temperature, guide-plates 22, 23 can be fitted in front and at the back of the working gap 21 between the working rollers 1, 2, and may be provided with a suitable heating device 24. Without these heating devices the guide-plates 22, 23 serve as guides for the goods A. Or, the guide plates may be cooled instead of heated, and a single guide plate, either at the front or at the rear, may be provided.

To prevent scraped off clinging bits, removed by the pressure-bars 15 or by the scraping device 19 from falling back on to the processed goods and thereby soiling them, which is very easily possible when dealing with textile-fibres in fleece squeezers, a trough-shaped catch-strip 25 is provided at the delivery point of the processed goods A through the work gap 21 of the working rollers 1, 2, its one edge entering the delivery slot 26 wedge fashion, and due to this shape it can even act as scraper itself. The closer the wedge-shaped edge 27 of the catch-strip 25 is brought to the pressure line of the working rollers 1, 2 the more easy it is to prevent the contamination of the roller surfaces and, in the case of fleece squeezers, of the web of the fibre fleece. The

catch-strip 25 can also be made as a container 28 for chemical solvent 29, as shown in Figure 5. Such a solvent can be applied in different ways to the surface of the working rollers, for instance by means of a roller 30 partly submerged into the solvent and covered with an absorbent lining or the like which transmits the solvent to a second resilient roller 31, which in turn rolls against the surface of the working roller 1 and rubs it clean. The foreign particles are thus loosened from the surface of the rollers and are thrown into the catching trough in the direction of the arrow. The mechanical and/or chemical cleaning devices provided ensure that the working rollers are always presented in a mirror-bright condition to the goods to be processed. Catching devices of the sort described can obviously also be similarly fitted to the working roller 2.

The invention can be applied to all kinds of rolling devices with great advantage where it is important to retain the thickness of the material to be processed always constant. This is desirable, for instance, for calendars for the manufacture of paper and also for thin sheet metal manufacture. The advantageous use of the device for fleece squeezers has already been mentioned. In any case it is possible to build the rolling devices lighter than was hitherto possible. The diameter of the working rollers can be kept appreciable smaller, because the rollers are not subjected to bending, but only to an even compression over the whole working width. The use of hollow roller bodies made possible hereby offers the advantage of temperature control of the processed goods without complicating the design of the machine. The machine needs less room than known rolling devices whilst the inlet and outlet means can be kept short and can be used for the temperature control of the processed goods as well.

What we claim is:—

1. A device for rolling carded fibre fleece and other material, including two working rollers mounted in end-bearings and co-operating to roll and press the material, the one working roller being supported along the whole of its length by a non-rotatable and stationary beam, and the other working roller being acted upon along the whole of its length by a non-rotatable beam which is slidable relatively to said first-mentioned beam, means being provided for exerting pressure on the ends of the said slidable beam, and the end-bearings for the two rollers being freely and independently guided in end supports, so that pressure is transmitted from the slidable beam to the working rollers whilst leaving the end-bearings of the working rollers free of pressure.

2. A rolling device as claimed in claim 1, having additional working rollers supported by angularly-movable beams.

3. A rolling device, as claimed in claim 1 or 2, wherein a pressure-transmitting member or bar of the same length as the working roller is interposed between each beam and the respective working roller.

4. A rolling device as claimed in claim 3, wherein the interposed pressure-transmitting member consists of a roller.

5. A rolling device as claimed in any one of the preceding claims wherein the working rollers are hollow.

6. A rolling device as claimed in claim 3 or 4, wherein the pressure-transmitting member is designed as a heating or cooling element.

7. A rolling device as claimed in claim 6, wherein the pressure transmitting member is designed, preferably as a plain bearing, so that it generates frictional heat by engagement with the working roller to raise the temperature of the latter.

8. A rolling device as claimed in claim 5, wherein the hollow working rollers serve as housings for heating or cooling media.

9. A rolling device as claimed in any one of the preceding claims, wherein the working rollers are supported by beams carrying scraping devices which bear resiliently against the working rollers and which are of the same length as the latter.

10. A rolling device as claimed in claim 3 or 9, wherein a catch device operates in conjunction with the pressure-transmitting bar or scraping device for receiving particles scraped off the working rollers.

11. A rolling device as claimed in claim 10, wherein the catch device projects in a wedge-like manner into the delivery slot between the working rollers and acts as a scraper.

12. A rolling device as claimed in claim 10 or 11, wherein the catch device forms a container for a chemical solvent, which is applied to a resilient spreading roller by which the solvent is carried to the surface of a working roller.

13. A rolling device as claimed in any one of the preceding claims, wherein guiding plates are arranged in front of and/or behind the working gap between the working rollers, the said guiding plates being adapted to be either heated or cooled.

H. N. & W. S. SKERRETT,
24, Temple Row,
Birmingham, 2,
Agents for Applicants.

Printed by Her Majesty's Stationery Office Press, 55-57, Drury Lane, W.C.2.—1956
Published at the Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained